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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/767,658	01/29/2004	Masaki Okamoto	36409	5389
116 7590 12/20/2006 PEARNE & GORDON LLP 1801 EAST 9TH STREET SUITE 1200 CLEVELAND, OH 44114-3108			EXAMINER PATEL, SHAMBHAVI K	
			ART UNIT 2128	PAPER NUMBER
SHORTENED STATUTORY PERIOD OF RESPONSE		MAIL DATE	DELIVERY MODE	
3 MONTHS		12/20/2006	PAPER	

Please find below and/or attached an Office communication concerning this application or proceeding.

If NO period for reply is specified above, the maximum statutory period will apply and will expire 6 MONTHS from the mailing date of this communication.

Office Action Summary

Application No.

10/767,658

Applicant(s)

OKAMOTO ET AL.

Examiner

Shambhavi Patel

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 27 November 2006.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-14 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-14 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
- ☐ Certified copies of the priority documents have been received.
 - ☐ Certified copies of the priority documents have been received in Application No. _____.
 - ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08)
Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

1. Claims 1-14 are pending.

Response to Arguments

2. Applicant's arguments filed 27 November 2006 have been fully considered but they are not persuasive.

Regarding the 35 U.S.C. 101 rejection:

- i. The Applicant submits that claims 1-12 have been amended, rendering the rejection moot. However, the Examiner directs the Applicant to the 101 rejection in the Office Action dated 8 September 2006, which rejected these claims for failing to produce a tangible result. The Examiner respectfully asserts that the amendments are not sufficient to overcome the original rejection, because *executing a simulation of the second step does not produce a result that is stored or conveyed to the user*. **The Examiner maintains the 101 rejection of claims 1-12.**
- ii. **The Examiner withdraws the 35 U.S.C. 101 rejection of claim 13 in view of the Applicant's supporting arguments.**
- iii. The Applicant submits that claim 14 constitutes statutory subject matter and that the rejection should be withdrawn accordingly. The Applicant further submits that 'claim 14 provided for a simulation method or process that generates a first simulated result, followed by a second simulated result that is based on the first simulated result...' However, the claim does not specifically recite a second simulated result. Assuming that the Applicant is correct regarding the first and second simulation results, the claim still does not produce a tangible result, because *said first and second*

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simulation results are not stored or conveyed to the user. The Examiner maintains the 101 rejection of claim 14.

Regarding the 35 U.S.C. 112 rejection:

- iv. **The Examiner withdraws the 35 U.S.C. 112 rejections in view of the Applicant's amendments.**

Regarding the 35 U.S.C. 102 rejections:

- v. Applicant's arguments fail to comply with 37 CFR 1.111(b) because they amount to a general allegation that the claims define a patentable invention without specifically pointing out how the language of the claims patentably distinguishes them from the references.
- vi. On page 10 of the remarks, Applicant merely states that Sarvar does not teach the limitations of the claims (either in their original or amended forms). Please see the 102 rejection below.

Claim Rejections - 35 USC § 101

35 U.S.C. 101 reads as follows:

Whoever invents or discovers any new and useful process, machine, manufacture, or composition of matter, or any new and useful improvement thereof, may obtain a patent therefor, subject to the conditions and requirements of this title.

- 3. **Claims 1-12 and 14 are rejected under 35 U.S.C. 101** because the claimed invention is directed to non-statutory subject matter. The Examiner asserts that the current state of the claim language ('...program recorded on a computer-readable medium causing a computer to execute...') is such that a reasonable interpretation of the claims would not result in any useful, concrete or tangible product.

Regarding claims 1 and 14, executing a simulation of the second step does not produce a tangible result

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because the result is not stored or conveyed to the real-world user. All other claims are rejected by virtue of their dependency. See MPEP Section 2106 which recites:

The tangible requirement does not necessarily mean that a claim must either be tied to a particular machine or apparatus or must operate to change articles or materials to a different state or thing. However, the tangible requirement does require that the claim must recite more than a 35 U.S.C. 101 judicial exception, in that the process claim must set forth a practical application of that judicial exception to produce a real-world result. Benson, 409 U.S. at 71-72, 175 USPQ at 676-77 (invention ineligible because had "no substantial practical application."). "[A]n application of a law of nature or mathematical formula to a ... process may well be deserving of patent protection." Diehr, 450 U.S. at 187, 209 USPQ at 8 (emphasis added); see also Corning, 56 U.S. (15 How.) at 268, 14 L.Ed. 683 ("It is for the discovery or invention of some practical method or means of producing a beneficial result or effect, that a patent is granted . . ."). In other words, the opposite meaning of "tangible" is "abstract."

Claim Rejections - 35 USC § 102

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

4. **Claims 1-14 are rejected under 35 U.S.C. 102(b) as being clearly anticipated by Sarvar et al. ('Effective Modeling of the Reflow Soldering Process: Basis, Construction, and Operation of a Process Model'), herein referred to as Sarvar.**

Regarding claims 1 and 14:

Sarvar discloses a mounting process simulation program recorded on a computer-readable medium of causing a computer to execute a simulation of a mounting process composed of a plurality of steps, and a method of executing a simulation, comprising:

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- a. a first simulation executing step of executing a simulation based on a first condition selected for a first step (**Table III**). The first condition that is selected is the *specific heat capacity*.
- b. a simulation condition deciding step of selecting a simulated result from the first simulation executing step as a simulation condition for a second step positioned subsequent to the first step (**Table III**; '**Modeling of an Exemplar Product and Process Combination**'). The specific heat capacity is varied, and this value is used to calculate the peak temperatures.
- c. a second simulation executing step of executing a simulation-of the second step based on a second condition containing at least the simulation condition (**Table III**). The second condition, *peak temperature*, is calculated during the simulation based on the first condition, the *specific heat capacity*.

Regarding claim 2:

Sarvar discloses simulating a typical reflow profile (page 128 '**Radiative Heating**'). The temperature is varied with time (*conditions*), and this data is used to calculate the output. Therefore, the output (*analysis data*) is calculated during *each* temperature variation. The Examiner interprets 'analysis result data' to be data produced in the first simulation step that is then analyzed and/or sampled in the second simulation step, and 'wherein analysis result data simulated previously based on a plurality of conditions are generated every step' to mean that this data is produced at every step.

Regarding claim 3:

Sarvar discloses varying the specific heat capacity to record the temperature changes (page 131 '**Modeling Variable Materials Data**' paragraphs 1-3). The variable behavior of the specific heat

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capacity is represented in the models using *interpolation tables for each variable material*. **Sarvar discloses** simulating a typical reflow profile (**page 128 ‘Radiative Heating’**). The temperature is varied with time (*conditions*), and this data is used to calculate the output. Therefore, the output (*analysis data*) is calculated during *each* temperature variation. The Examiner interprets ‘analysis result data’ to be any data produced in the first simulation step that is then analyzed and/or sampled in the second simulation step, and ‘wherein analysis result data simulated previously based on a plurality of conditions are generated every step’ to mean that this data is produced at every step.

Regarding claim 4:

Sarvar discloses deriving the specific heat capacity by using samples analyzed with a calibrated Mettler TA3000 differential scanning calorimeter (**page 129 ‘Specific Heat Capacity Values’ paragraph 1**). This is analogous to the outside device in the claim language. The derived value is then converted to a computed-readable value and used in the simulation (**page 132 ‘Modeling of an Exemplar Product and Process Combination’ paragraph 1**). **Sarvar discloses** simulating a typical reflow profile (**page 128 ‘Radiative Heating’**). The temperature is varied with time (*conditions*), and this data is used to calculate the output. Therefore, the output (*analysis data*) is calculated during *each* temperature variation. The Examiner interprets ‘analysis result data’ to be any data produced in the first simulation step that is then analyzed and/or sampled in the second simulation step.

Regarding claim 5:

Sarvar discloses the simulation program of claim 4 wherein the experimental data simulated at every step via a CAE tool is selected as the analysis result data (**page 127 ‘Outline of System Components’ 2nd paragraph; page 129 ‘Specific Heat Capacity Values’ paragraph 1**), wherein the type of data selected as the analysis result data is converted to a common format (**figure 1 post**

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processing and data presentation). The specific heat capacity is experimentally derived and is then used in the simulation as the analysis result data to calculate its effect on the temperature variation (page 132 'Modeling of an Exemplar Product and Process Combination' paragraph 1).

Regarding claim 6:

Sarvar discloses a mounting process simulation program recorded on a computer-readable medium according to claim 1, further causing the computer to execute an animation displaying step of displaying three-dimensionally an animation to indicate a result simulated in the second simulation executing step on a display device, by reading previously- stored animation elements based on a definition file in which an operation sequence is defined every step (figure 8; page 132 'Modeling of an Exemplar Product and Process Combination' paragraph 1).

Regarding claim 7:

Sarvar discloses a mounting process simulation program recorded on a computer-readable medium according to claim 1, wherein the second simulation executing step includes a condition acquiring step of reading a condition selected in response to an input from a condition database in which a plurality of conditions are stored previously in combination, and adding the condition to the second condition (page 131 'Modeling Variable Materials Data' paragraph 3). The specific heat capacity is modeled using tables.

Regarding claim 8:

Sarvar discloses a mounting process simulation program recorded on a computer-readable medium according to claim 7, wherein the condition acquiring step further reads data from a CAD system in response to the input and adds the data to the second condition (figure 1).

Regarding claim 9:

Sarvar discloses a mounting process simulation program recorded on a computer-readable medium according to claim 1, wherein the first simulation executing step executes the simulation to contain production variation in the first step (**Table III: production variation specific heat capacity**), the simulation condition deciding step decides the result simulated in the first simulation executing step to contain the production variation as the simulation condition and the second simulation executing step executes the simulation of the second step based on the second condition to contain the production variation (**Table III: simulation to determine variation in temperature due to variation in specific heat capacity**).

Regarding claim 10:

Sarvar discloses a mounting process simulation program recorded on a computer-readable medium according to claim 1, wherein the first simulation executing step executes the simulation based on a change of a control item set in the first step as the first condition (**Table III: control item/first condition is specific heat capacity**), the simulation condition deciding step decides the result simulated based on the change of the control item in the first simulation executing step as the simulation condition, and the second simulation executing step executes the simulation of the second step based on the second condition to contain the result simulated based on at least the change of the control item (**Table III: simulation to determine variation in temperature due to variation in specific heat capacity**).

Regarding claim 11:

Sarvar discloses a mounting process simulation program recorded on a computer-readable medium according to claim 1, further causing the computer to execute a reliability evaluating step of

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executing a reliability evaluation of a product manufactured in the mounting process by using the result simulated in the second simulation executing step (**figure 6**).

Regarding claim 12:

Sarvar discloses a mounting process simulation program recorded on a computer-readable medium according to claim 1, further causing the computer to execute a fraction defective calculating step of calculating a fraction defective of a product manufactured in the first step and the second step, by using results simulated in the first simulation executing step and the second simulation executing step

(Introduction: paragraphs 2 and 3).

Regarding claim 13:

Sarvar discloses a mounting process simulation system provided to steps of a mounting process composed of a plurality of steps to execute a simulation of the mounting process, comprising:

- a. an inputting portion for inputting a condition to execute the simulation (**figure 1**)
- b. an executing portion for executing the simulation based on the condition input from the inputting portion (**figure 1**)
- c. an outputting portion for outputting a result of the simulation executed by the executing portion (**figure 1**)
- d. wherein the executing portion includes:
 - i. a condition table forming portion that forms a condition table of a second step positioned subsequently to a first step, whereby the condition table is formed by using a simulation result simulated based on a first condition selected for at least a first step, of a second step positioned subsequently to a first step (page 131 'Modeling Variable Materials Data' paragraphs 1-3).

The first condition is the *specific heat capacity*, and this is modeled using an *interpolation table*. The first step is varying the heat capacity, and the second step is measuring the temperature.

- ii. simulation result outputting portion executes the simulation of the second step based on the condition table and a condition input from the inputting portion and outputs a result to the outputting portion (page 131 'Modeling Variable Materials Data' paragraphs 1-3). The variation of the temperature is calculated based on this first condition.

Conclusion

5. **THIS ACTION IS MADE FINAL.** Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire **THREE MONTHS** from the mailing date of this action. In the event a first reply is filed within **TWO MONTHS** of the mailing date of this final action and the advisory action is not mailed until after the end of the **THREE-MONTH** shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than **SIX MONTHS** from the mailing date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Shambhavi Patel whose telephone number is (571) 272-5877. The examiner can normally be reached on Monday-Friday, 8:00 am – 4:30 pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Kamini Shah can be reached on (571) 272-2279. The fax phone number for the organization where this application or proceeding is assigned is (571) 273-8300.

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Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

SKP

Shambhavi Patel
Examiner
Art Unit 2128



KAMINI SHAH
SUPERVISORY PATENT EXAMINER